

## CLAIMS

1. A control apparatus comprising a movable control member; a positional servo loop consisting of a motor having a movable armature thereby maintaining the position of the control member at any one of a plurality of positions in a range of movement thereof in accordance with a demand signal, and means for measuring current applied to the motor for detecting a force applied to the control member and for providing the demand signal which varies in accordance with the magnitude of the applied force, wherein the control member is rigidly attached to the armature so that movement of the control member is mirrored by movement of the armature.
2. A control apparatus according to Claim 1 further comprising a force servo loop wherein the positional and force servo loops are electronic and operate on a digital basis.
3. A control apparatus according to Claim 1 or 2 further comprising a pulse width modulator to convert an error signal resulting from the demand signal and the measured current to a pulse train to drive the motor, motor inductance means being provided to integrate the pulse train into a current based on the error signal.
4. A control apparatus according to any preceding claim, wherein the motor is linear.
5. A control apparatus according to any preceding claim further comprising position sensing or encoding means for providing an output signal determined by the position of the control member.
6. A control apparatus according to Claim 5 wherein the position sensing or encoding means is non-contact.
7. A control apparatus according to Claim 5 or 6 wherein the position sensing or encoding means is a potentiometer or magnetic transducer.
8. A control apparatus according to Claim 5 or 6 wherein the position sensing or encoding means is an optical encoder.

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9. A control apparatus according to Claim 8 wherein an optical encoder grating is attached to or provided directly on the armature of the motor.
10. A control apparatus according to any preceding claim further comprising detent friction threshold means for locally thresholding the force detection means at at least one predetermined location within the range of movement of the control member, whereby an applied force above the localised threshold is required to alter the position of the control member, thereby providing a detent effect.
11. A control apparatus according to Claim 10 further comprising means responsive to the speed of movement of the control member to adjust each threshold level to provide a velocity damping effect.
12. A control apparatus according to any preceding claim wherein the means for detecting a force further comprises means for monitoring a drive signal of the motor to determine the force transmitted by the control member to the motor.
13. A control apparatus according to any preceding claim further comprising automatic control means responsive to a positional signal representative of the position of the movable control member and an externally-generated auto-control signal indicating a required position for the control member thereby to provide the demand signal for the positional servo loop, whereby in use the control member is caused to move to or maintain the required position.
14. A control apparatus according to any one of Claims 10 to 13 further comprising means for allowing dynamic reprogramming of at least one of the friction threshold and velocity damping characteristics of the control member.